

CMGT 599: Data Analytics and Visualization Spring 2017

Instructor: Liuning "Matt" Zhou, Ph.D.

Class time: Wednesday, 6:30 pm - 9:20 pm

Classroom: ASC 240

Office: ASC 321

Office hours: Wednesday, 4 pm - 5:30 pm or by appointment

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Check your email linked to Blackboard regularly. The instructor relies on email to inform students about class agenda and logistical details.

Course Overview and Objectives

Taught from the perspective of market researcher/research analyst, this course aims to help graduate students make sense of data and improve their data-based digital storytelling skills for effective communication. To accomplish those goals, the course focuses on two major topics, data analytics and data visualization. It starts with the conceptualization of empirical research, and concludes with visual display of research findings to target audiences. It provides students with a deep conceptual understanding of the research process as well as practical skills in analytics and visualization necessary to succeed as a researcher in commercial firms and non-profit research organizations.

The course consists of three modules: (i) Basics of Market Research; (ii) Advanced Statistics for Market Research; and (iii) Data Visualization. The first module introduces some key statistical concepts and SPSS' programming function for data analytics and management, as well as the fundamental components of the market research process. The second module focuses on more advanced statistical techniques for market research, including multiple regression, factor analysis, cluster analysis, and discriminant analysis. Students develop a deep conceptual understanding of those methodologies and a thorough knowledge of their application in different market research scenarios. The third module covers the principles behind data visualization, and introduces guidelines for designing effective visual displays to communicate research findings. Throughout the semester, class meetings are conducted through a combination of lectures, group activities, and cases of data analytics and visualization.

By the end of the semester, students will walk away with practical skills needed to succeed as a research analyst and data communication specialist. Specifically, students will be able to: (i) command a conceptual understanding and the ability to manage different aspects of the market research process; (ii) use SPSS syntax for data analytics and management; (iii) adopt appropriate statistical procedures to conduct analyses depending on the research goals and the nature of survey data; (iv) develop insights based on analytical results to help clients better understand consumer attitudes, perceptions and behavior; and (v) use computer software programs such as

SPSS, Excel and PowerPoint to create data visualization packages for effective communication through messages and images/graphs.

Course Materials

Textbooks (optional)

Data Visualization and Presentation with Microsoft Office, by Valerie M. Sue and Matthew T. Griffin, SAGE, 2016.

An Intermediate Guide to SPSS Programming, by Sarah Boslaugh, SAGE, 2005.

Other Materials

The course syllabus is posted under "Syllabus" in Blackboard. Other materials introduced during the semester are either posted in Blackboard under "Weekly Materials" or provided to students in class.

Assessment

Homework assignments, group exercises, and group project

Student performance in this class is evaluated based on three homework assignments, four group exercises, a group project, and class participation.

Homework assignments and group exercises submitted 15 minutes late without a good reason will be assessed a 15% deduction from the original percentage.

There is a total of three individual homework assignments, each counting 12% towards the final course grade. The assignments involve designing survey questionnaire, visualizing data, and running statistical analysis using SPSS.

There is a total of four group exercises that give students the opportunity to practice data analysis and visualization skills, each counting 6% towards the final course grade.

There is a group project due at the end of the semester. It requires students to work in groups, analyzing data, identifying the story behind the numbers, and sharing their stories/insights through communicative images and messages. It accounts for 35% of the final grade.

Class participation accounts for 5% of the final grade. It consists of contributions to class discussion, interaction with guest speakers, listening to others in class, and sharing ideas for group work (i.e., group exercise and group project).

Detailed instructions on homework assignments, group exercises, and group project will become available when they come up.

Homework Assignments (3 x 12%)	36%
Group Exercises (4 x 6%)	24%
Group Project	35%
Class Participation	5%

Grading Schema

The following grading scheme is adopted for this class:

A	93% or higher
A-	90%-92.99%
B+	87%-89.99%
B	83%-86.99%
B-	80%-82.99%
C+	77%-79.99%
C	73%-76.99%
C-	70%-72.99%
D	60%-69.99%
F	59.99% or lower

Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

Note: Any draft submitted to the instructors is a formal document, subject to the University’s policies regarding plagiarism. Plagiarism is not excused for drafts.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu/> or to the *Department of Public Safety* <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>.

This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Support Systems

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more.

Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students.

The Office of Disability Services and Programs

http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations.

If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

Online Resources

1. Market Research

www.quirks.com/articles/index.aspx

2. SPSS/Statistics

www.ats.ucla.edu/stat/spss/
www.onlinestatbook.com

3. Data Visualization

www.highcharts.com/
www.piktochart.com/
www.venngage.com/
www.canva.com/
www.flowingdata.com

Schedule of Class Meetings

<p>Week 1 January 11</p> <p>Module I: The Basics (1)</p>	<p>Topics: review of course syllabus; levels of measurement; statistical concepts (i.e., normal distribution, statistical significance, population and sample, and descriptive and inferential stats)</p> <p><u>Readings</u> http://www.statsoft.com/Textbook/Elementary-Statistics-Concepts#Measurement_scales</p> <p>http://www.statsoft.com/Textbook/Elementary-Statistics-Concepts#Why the "Normal distribution" is important</p> <p>http://www.statsoft.com/Textbook/Elementary-Statistics-Concepts#Are all test statistics normally distributed</p> <p><u>Lesson Activity</u> Form groups for group exercises and class project</p> <p><u>Homework 1</u> Questionnaire design: rewrite 10 questions from a psychology survey using a variety of measurement scales</p>
<p>Week 2 January 18</p> <p>Module I: The Basics (2)</p>	<p>Topics: Market research process; research proposal; external timeline; questionnaire design; sampling; consumer panel</p> <p><u>Readings</u> Examples of research proposals and external timeline are posted in Blackboard.</p> <p><u>Guest Speaker 1</u>: on market research (i.e., the industry, practice and process)</p> <p>Note: Homework 1 <u>DUE</u> by 6:30 pm in instructor's email box</p>
<p>Week 3 January 25</p> <p>Module I: The Basics (3)</p>	<p>Venue: Computer lab TBD</p> <p>Topics: introduction to SPSS syntax; SPSS syntax for data analysis/transformation/management</p> <p><u>NO READINGS</u></p>

	<p><u>Group Exercise 1</u> Data analysis and management using SPSS syntax</p>
<p>Week 4 February 1</p> <p>Module II: Advanced Statistics for Market Research (1)</p>	<p>Venue: Computer lab TBD</p> <p>Topics: cluster analysis; segmentation analysis; profiling study</p> <p><u>Readings</u> Relevant materials are posted in Blackboard.</p>
<p>Week 5 February 8</p> <p>Module II: Advanced Statistics for Market Research (2)</p>	<p>Venue: Computer lab TBD</p> <p>Topics: factor analysis; correspondence analysis</p> <p><u>Readings</u> Relevant materials are posted in Blackboard.</p>
<p>Week 6 February 15</p> <p>Module II: Advanced Statistics for Market Research (3)</p>	<p>Venue: Computer lab TBD</p> <p>Topics: regression analysis; key driver analysis</p> <p><u>Readings</u> http://www.statsoft.com/Textbook/Multiple-Regression</p> <p>Other relevant materials are posted in Blackboard.</p> <p><u>Homework 2</u>: Multiple regression analysis using SPSS</p>
<p>Week 7 February 22</p> <p>Module II: Advanced Statistics for Market Research (4)</p>	<p>Venue: Computer lab TBD</p> <p>Topics: discriminant analysis; creating charts using SPSS syntax</p> <p><u>Readings</u> http://www.statsoft.com/Textbook/Discriminant-Function-Analysis</p>

	Other relevant materials are posted in Blackboard. Note: Homework 2 <u>DUE</u> by 6:30 pm in instructor's email box
Week 8 March 1 Module II: Advanced Statistics for Market Research (5)	Topics: market intelligence and consumer insights; banner plan and crosstabs <u>Readings</u> Relevant materials are posted in Blackboard. <u>Guest Speaker 2:</u> on deriving consumer insights through data analytics <u>Lesson Activity</u> Instructor shares data for initial discussion of final group project
Week 9 March 8 Module III: Data Visualization (1)	Topics: history and principles of visual communication and data visualization; types and stages of data charting/visualization <u>Readings</u> Relevant materials are posted in Blackboard. <u>Lesson Activity</u> Review/critique cases of data visualization <u>Group practice</u> Develop and chart data for fundraising campaigns Chart Internet study data using Excel and PowerPoint
March 15	Spring Break; no class
Week 10 March 22 Module III: Data Visualization (2)	Topics: editorial focus in data visualization; data preparation for charting; taxonomy of data visualization methods <u>Readings</u> Relevant materials are posted in Blackboard. <u>Group Exercise 2</u> Chart online media consumption data using Excel and PowerPoint

	<u>Homework 3</u> : Visualize social and online time data using MS Office
Week 11 March 29 Module III: Data Visualization (3)	<p>Topics: principles and techniques of graphic design; form, layout, composition, typography and colors; data visualization using MS Office</p> <p><u>Readings</u> Relevant materials are posted in Blackboard.</p> <p><u>Guest Speaker 3</u>: on graphic design and data visualization</p> <p><u>Group Exercise 3</u> Create infographics on Venngage using sports survey data</p> <p>Note: Homework 3 <u>DUE</u> by 6:30 pm in instructor's email box</p>
Week 12 April 5 Module III: Data Visualization (4)	<p>Topics: narrative visualization and digital storytelling; infographics</p> <p><u>Readings</u> Relevant materials are posted in Blackboard.</p> <p><u>Group practice</u> Practice storytelling using identity theft data</p> <p><u>Lesson Activity</u> Review/critique cases of data visualization Group meeting with instructor on progress of group project</p> <p><u>Group Exercise 4</u> Segment sports fans based on intensity of interest (intense sports fans vs. moderate sports fans) and visualize comparative data</p>
Week 13 April 12 Module III: Data Visualization (5)	<p>Topics: role of memory; model of perceptual processing; infographics</p> <p><u>Readings</u> Relevant materials are posted in Blackboard.</p> <p><u>Group practice</u> Create infographics on Venngage using transportation survey data</p>

	<u>Lesson Activity</u> Group meeting with instructor on progress of group project
Week 14 April 19	Topics: final deliverables in market research; research ethics; the data fluency culture <u>Readings</u> Relevant materials are posted in Blackboard. <u>Lesson Activity</u> Group meeting to finalize group project
Week 15 April 26 Group Project Presentation	Topics: presentation of group projects; wrap-up
May 3	Group Project DUE by 6:30 pm in instructor's email box (liuningz@usc.edu).